Report:
PCB Characterization of Spokane Regional Vactor Waste Decant Facilities

Prepared for the Spokane River Regional Toxics Taskforce

September, 2015

By:

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Background

The Spokane River has been listed as an impaired water body for polychlorinated biphenyls (PCBs). PCBs are a manmade chemical with no known natural sources. PCBs have been used in a variety of applications in the past, including insulating fluids for transformers and capacitors, hydraulic fluids, and plasticizers in paints, caulking and cements. Because of their toxicity, PCBs have been banned by the EPA in all manufacturing processes since 1977. Some PCBs, however, still get produced inadvertently today during the production of other chemicals. PCBs do not readily degrade and bio-accumulate in the environment.

The Spokane River Regional Toxics Taskforce (SRRTTF) was formed in 2012 to address the issue of PCBs in the Spokane River. SRRTTF is a collection of regulators, public and private dischargers, environmental groups, and other interested parties spanning both Idaho and Washington. SRRTTF has taken on the adaptive management approach (source identification and cleanup actions are pursued concurrently) to address the PCB issue in this area. With the goal of making measured PCB reductions in the Spokane River sooner rather than later, the adaptive management approach was chosen as an alternative to the predictably long and costly process of developing a TMDL. The ultimate goal of the taskforce is to make measurable progress towards meeting the water quality standards for PCBs in the Spokane River.

Stormwater runoff has been one of the previously identified contributors to PCBs in the Spokane River. As part of the Eastern Washington Phase II Municipal Permit, best management practices (BMPs) require stormwater catch basins to be periodically cleaned out to remove buildup of solids. Previous testing by the City of Spokane has shown that catch basin sediment can contain orders of magnitude greater PCB content than the stormwater itself. This can be reasoned due to the fact that PCBs are generally hydrophobic and tend to adhere to the particulate material in a given waste stream. Monitoring by the city has shown that in the Union Stormwater and CSO 34 area of the system, total PCBs in catch basin sediment ranged between 25 μg/kg and 1,700 μg/kg. These samples were taken from an industrial area with known PCB contamination. Only one sample was taken in an area representing a more typical catch basin, which gave a result of 13 μg/kg.

Stormwater sediment is removed from catch basins in the Spokane area by using vacuum eductor trucks (vactors). Environmental concerns were raised in recent years about how this material was being handled. The material itself still contains a significant amount of free liquids and must be drained and dried before it can be disposed. Regionally, Beginning in 2014, two new decant facilities came online, with a third set to come online in 2015, to allow for catch basin sediment to be drained and dried prior to land-filling or recycling. These facilities were designed as, essentially, large concrete pads where the sediment is allowed to drain. The liquid portion of the sediment is then either treated prior to infiltration in the case of the Spokane County and Joint WSDOT-City of Spokane Valley facility or directed to an evaporation pond in the case of the City of Spokane facility.

City of Spokane Decant Facility

The City of Spokane Decant Facility is located at 2813 E. Ferry Ave. on what was formerly the Playfair site. The facility consists of an approximately 20,000 square-ft covered concrete slab which drains into an evaporation pond. The evaporation pond was designed such that overflows would not occur. Stormwater sediment is taken to landfill after it has sufficiently dried on the pad. The landfill the City currently uses is the North Side landfill, but plans are underway to transition to the Graham Rd. landfill. It is anticipated that solids will accumulate in the pond over time and will have to be removed periodically and taken to landfill as well.

Fig-1 City of Spokane Decant Facility – vactor unloading

City of Spokane Valley/WSDOT Pines Decant Facility

The joint City of Spokane Valley –WSDOT facility is located at E. 12102 Montgomery Dr., adjacent to I-90, just west of the Pines Exit. The facility consists of an approximately 6,400 square-ft slab which allows decanted material to drain into an adjacent settling pool. Water from the settling pool is then directed to an oil-water separator, followed by a sand filter bed, and finally to a bio-infiltration pond. Stormwater exceeding the capacity of the bio-infiltration pond is directed to a drywell. There are plans to cover this facility in the future as well as potentially discharge decant-water to the sewer leading to the Spokane County Reclamation Facility.

Fig-2 City of Spokane Valley/WSDOT facility

Spokane County Decant Facility

Construction is currently underway for the Spokane County Facility at 12807 N. Mayfair in North Spokane and is anticipated to be completed by mid-2015. The capacity of the facility will be similar to the Playfair location, with a 100-ft-by-200-ft covered concrete slab. Decanted liquid will be treated with an oil-water separator followed by a bio-swale and dry well. Testing of this facility was not included in this study.

Fig-3 Spokane County Decant Facility – under construction

Project Overview

The primary goal of this project was to characterize the material at the regional decant facilities for PCBs. By determining the movement of PCBs through these facilities, each treatment method could be assessed and compared. The extent to which PCBs could be reintroduced to the environment through how these different facilities are operated could then be determined. For example, at the City of Spokane facility, PCB-laden dust could be resuspended as dust and locally deposited back into the stormwater system. With the Pines facility, PCB-containing liquid runoff could potentially be reintroduced into the aquifer and river after it infiltrates. Understanding the effectiveness of the treatment techniques utilized at decant facilities could potentially inform other projects involving similar stormwater treatment methods.

Obtaining data on the PCB content of the solid material at these facilities could also allow for removal rates to be estimated for catch basin sediment removal. This could provide one metric for demonstrating measureable progress towards reducing PCB levels in the Spokane River.

Additional analytes besides PCBs were tested to see if correlations existed with other parameters of concern. A QAPP was developed by City of Spokane staff which detailed how sampling and testing would be accomplished.

Samples were taken on April 16th and April 17th, 2015 at the City of Spokane facility and on April 22nd and 23rd, 2015 at the DOT/Pines facility. All samples were taken by City of Spokane staff. PCB samples were analyzed by AXYS labs in British Columbia. Metals and total suspended solids were analyzed at the City of Spokane RPWRF Lab. pH and Temperature measurements were taken in the field. Sample locations and the associated analyses are summarized in Table 1.

Table 1: Sampling/Testing Overview

Sample Location	Sample Description	Analyte	Test Method
COS Evaporation Pond Influent	Liquid runoff from sediment at City of Spokane Facility – sampled from outfall leading to evaporation pond	PCB Congeners (209)	EPA 1668 C
		Total Metals (As, Cd, Cr, Cu, Pb, Zn)	EPA 200.7
		Total Suspended Solids	SM 2540 D
		Temperature	--
		pH	SM 4500 H+
COS Vactor Sediment	Sediment from City of Spokane Facility - sampled from pile	PCB Congeners (209)	Modified EPA 8270
Pines Facility Liquid Runoff	Liquid runoff from sediment – sampled from settling pond	PCB Congeners (209)	EPA 1668 C
		Total Metals (As, Cd, Cr, Cu, Pb, Zn)	EPA 200.7
		Total Suspended Solids	SM 2540 D
		Temperature	--
		pH	SM 4500 H+
Pines Facility Sand Filter-Treated liquid	Liquid – sampled from outfall of sand filter	PCB Congeners (209)	EPA 1668 C
		Total Metals (As, Cd, Cr, Cu, Pb, Zn)	EPA 200.7

Sample Location	Sample Description	Analyte	Test Method
		Total Suspended Solids	SM 2540 D
		Temperature	--
		pH	SM 4500 H+
Pines Facility Vactor Sediment	Sediment - sampled from pile	PCB Congeners (209)	Modified EPA 8270

The funding for the PCB analyses was provided by SRRTTF. The Cost associated with sampling and testing of the other parameters was covered by the City of Spokane.

Results

City of Spokane - Playfair Facility

Analytical results for the City of Spokane facility are summarized in Table 2.

Table 2: City of Spokane Facility - Results Summary

SAMPLE	DATE	Total PCBs (pg/L, ppq)	Total PCBs (ug/kg, ppb)	Temp (˚C)	pH	TSS (mg/L)
COS Vactor Sediment	4/16/2015		399			
COS Vactor Sediment	4/17/2015		11.9			
COS Evaporation Pond Influent	4/16/2015	25,257,519		10.2	7.07	7,740
COS Evaporation Pond Influent Dup	4/16/2015	6,889,355		10.2	7.07	9,500
COS Evaporation Pond Influent	4/17/2015	1,823,207		10.9	7.18	13,440

Table 2: Continued

SAMPLE	DATE	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Pb (mg/L)	Zn (mg/L)
COS Vactor Sediment	4/16/2015						
COS Vactor Sediment	4/17/2015						
COS Evaporation Pond Influent	4/16/2015	0.246	<0.0020	0.339	0.816	0.447	4.55
COS Evaporation Pond Influent Dup	4/16/2015	0.212	0.0021	0.296	0.696	0.409	4.03
COS Evaporation Pond Influent	4/17/2015	0.429	0.0022	0.408	1.243	0.439	6.11

Note: Additional metals species were analyzed besides those indicated in the QAPP. This data is included in appendix A.

WSDOT/City of Spokane Valley – Pines Facility

Analytical Results for the DOT/Pines facility are summarized in table 3.

Table 3: Pines Facility – Results Summary

SAMPLE	DATE	Total PCB's (pg/L, ppq)	Total PCB's (ug/kg, ppb)	Temp ˚C	pH	TSS (mg/L)
Pines Facility Vactor Sediment	4/22/2015		5.00			
Pines Facility Vactor Sediment DUP	4/22/2015		4.00			
Pines Facility Vactor Sediment	4/23/2015		3.06			
Pines Facility Settling Pond	4/22/2015	36,488		20.7	7.31	452
Pines Facility Settling Pond DUP	4/22/2015			20.7	7.31	391
Pines Facility Settling Pond	4/23/2015	103,939		15	6.9	1,365
Pines Facility Sand Filter Effluent	4/22/2015	842		17.7	7.49	7
Pines Facility Sand Filter Effluent DUP	4/22/2015	719		17.7	7.49	40
Pines Facility Sand Filter Effluent	4/23/2015	3,172		14.7	7.07	25.5

Table 3: Continued

SAMPLE	DATE	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Pb (mg/L)	Zn (mg/L)
Pines Facility Vactor Sediment	4/22/2015						
Pines Facility Vactor Sediment DUP	4/22/2015						
Pines Facility Vactor Sediment	4/23/2015						
Pines Facility Settling Pond	4/22/2015	<0.025	<0.002	0.025	0.093	0.050	0.58
Pines Facility Settling Pond DUP	4/22/2015	<0.025	<0.002	0.024	0.089	0.049	0.56
Pines Facility Settling Pond	4/23/2015	0.034	0.003	0.085	0.233	0.133	1.82
Pines Facility Sand Filter Effluent	4/22/2015	<0.025	<0.002	<0.005	0.013	<0.030	0.04
Pines Facility Sand Filter Effluent DUP	4/22/2015	<0.025	<0.002	<0.005	0.012	<0.030	0.03
Pines Facility Sand Filter Effluent	4/23/2015	<0.025	<0.002	<0.005	0.017	<0.030	0.07

Note: Additional metals species were analyzed besides those indicated in the QAPP. This data is included in appendix A.

Quality Control Data

Quality control data for PCBs are summarized in Table 4. Specific PCB QC issues are discussed below:

- The lab blank associated with the higher concentration liquid samples was above the acceptance criteria. However, the associated samples with this batch contained detections well above the range in the blank and did not significantly affect how the

PCB totals were calculated. The only sample which required blank correction for this batch, as per the rule stipulated in the QAPP, was the 4/22/2015 Pines Facility Settling pond sample (36,495 pg/L uncorrected versus 36,488 pg/L with the blank correction).

- The 4/22/2015 Pines Facility Settling Pond Sample bottle was broken in the lab prior to the extraction process. Only half of the sample was saved so the full 1L could not be used for the extraction. Reporting limits do not appear to have been raised significantly compared to the 4/23/2015 sample from the same location.
- The RPD for most of the congeners in the 4/16/2015 COS Settling Pond sample and its duplicate were outside the QAPP criteria of less than 50% (for results greater than 10 times the EDL). This likely has to do with the dynamic, episodic, nature of how flow is diverted when a truck unloads vactor water.
- Due to an oversight/communication error, laboratory duplicates were not analyzed by the contract lab (as was indicated in the QAPP).

Table 4: PCB QC Results Summary

SAMPLE	QC Sample Result	QAPP Acceptance Criteria	Passed Acceptance Criteria?
COS Solids Equipment/Field Blank - Total PCBs	29.0 pg/L	<5 ug/kg	yes
Pines Facility Liquid Field Blank - Total PCBs	26.1 pg/L	<200 pg/L	yes
Solids Lab Blank - Total PCBs	Non-Detect	<5 ug/kg	yes
Liquids Lab Blank 1 - Total PCBs	136 pg/L	<200 pg/L	yes
Liquids Lab Blank 2 - Total PCBs	306 pg/L	<200 pg/L	no
Solids LCS Recovery Range	79.6-113.0%	60-135%	yes
Liquids LCS Recovery Range	89.3-112.0%	60-130%	yes
Solids Surrogate Recovery Range	43.3-111%	40-130%	yes
Liquids Surrogate Recovery Range	29.1-93.2%	25-150%	yes
COS Evap. Pond Dup. RPD Range (for results >10x EDL)	28.1-126.3%	<50%	no
Pines Facility Sand Filter Dup. RPD Range (for results >10x EDL)	0.9-25.3%	<50%	yes
Pines Facility Vactor Sed. Dup. RPD Range (for results >10x EDL)	All <10x EDL	<50%	yes

All suspended solids results met the applicable QC requirements except for the Pines Facility sand filter effluent and duplicate sampled on 4/22/2015 (RPD: 140%, 7 mg/L vs. 40 mg/L; criteria: <30%). All total metals QC results met the respective QAPP acceptance criteria. A field blank was not collected or analyzed for suspended solids or metals due to a communication error with the sampling staff.

Results Discussion

The sediment results for both the Pines Facility and City of Spokane facility were found to be consistent with previous stormwater sediment testing conducted by the City. As can be seen in Table 2, the first sediment sample collected at the City of Spokane facility was significantly higher in PCBs than the one from the second day of sampling. The first sample is in the range of the previous PCB catch basin sampling conducted in the more industrial portion of the City. The second sample fell in line with what was found in the residential area sampling.

The Pines Facility sediment samples were both lower in total PCBs than the City of Spokane samples. It is hard to say, given the limited amount of data, whether this always would be the case, and would likely depend more on where a given vactor truck is collecting catch basin material for that given day. Determining the origin of the sediment tested within the catch basin system was beyond the scope of this study.

Figure 4 shows a comparison between individual congeners in the sediment at each of the two facilities monitored. For comparison purposes, each congener is represented as a ratio of the individual concentration to the total PCB concentration for a given sample. The error bars represent ± 1 standard deviation. As can be seen in the graph, the City of Spokane sediment appears to be more heavily concentrated in the mid-weight congeners whereas the Pines Facility samples appears to contain several lower and higher weight congeners that were not detected in the COS samples. PCB 11 was one of the lower weight congeners that was detected in the Pines Facility samples that did not show up in the COS samples. PCB 11 is often associated with PCBs generated inadvertently through the production of chemicals such as yellow dye and is generally not found in arochlor formulations of PCBs.

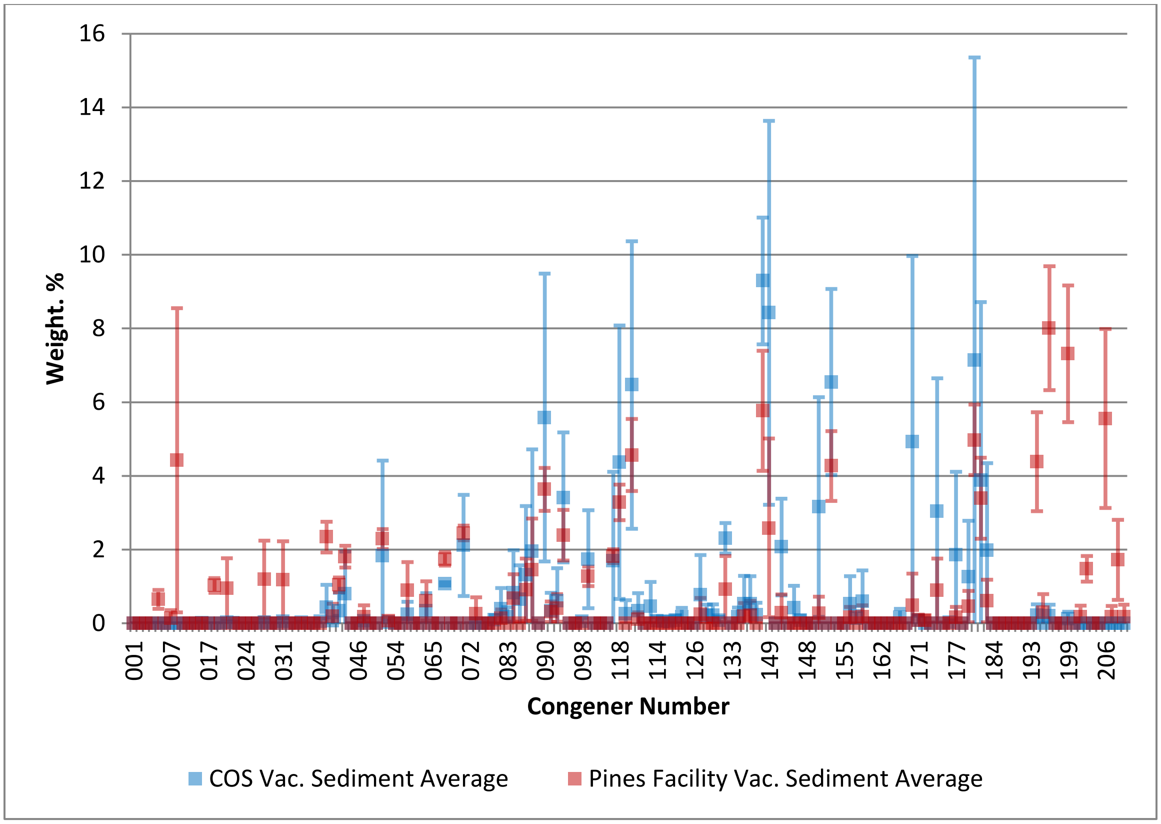

Fig-4 Congener Comparison between Pines Facility and COS Sediment Samples

Figure 5 is a similar comparison between the COS and Pines Facility liquid samples. Congener distributions appear to generally match with the sediment samples for each of the two sampling locations. It should be noted that the coeluting congeners differ between the method used for the sediment samples and the liquid samples and thus a direct comparison between the two datasets is made more difficult. The congener pattern of the Pines sand filter also correlates well with Pines Facility settling pond sampling, with perhaps a slight shift from some of the heavier weight congeners in the settling pond to more of the lighter weight congeners once the material passes through the sand filter.

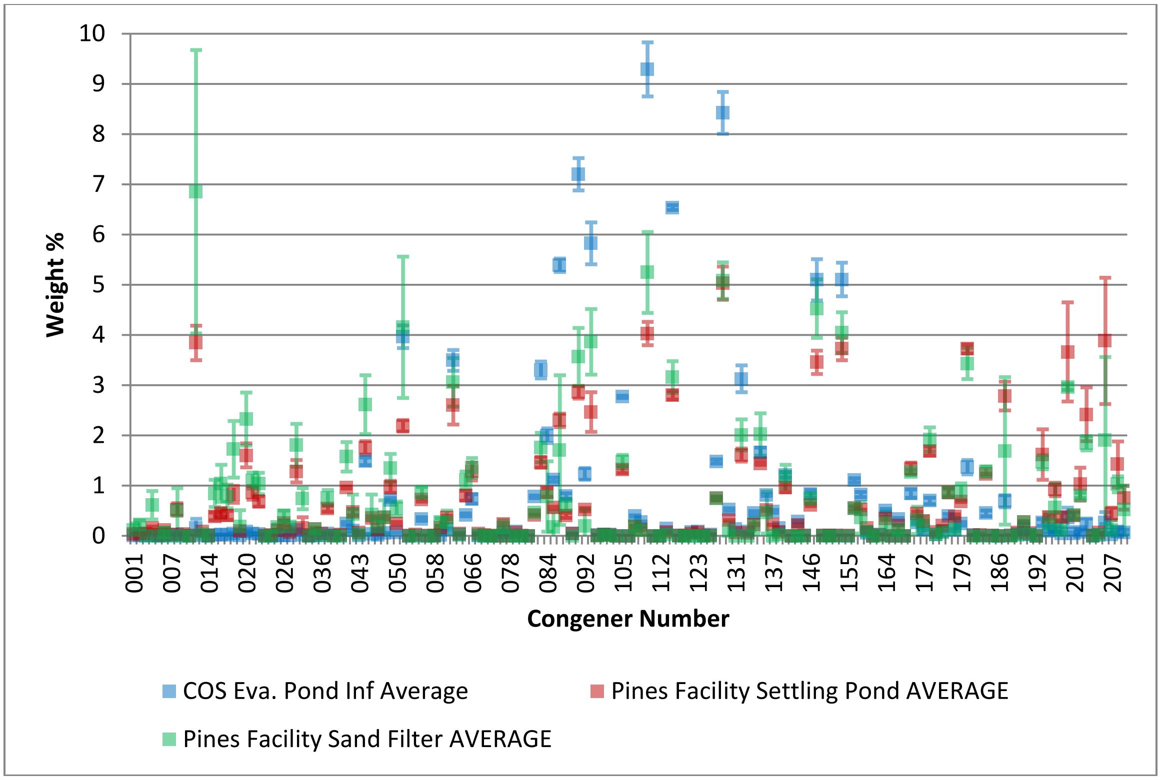

Fig-5 Congener Comparison between Pines Facility and COS Liquid Samples

Figures 6 and 7 compare the COS Evaporation Pond Influent and the Pines Facility Settling Pond samples, respectively, to the best-fit combination of specific Arochlors. Arochlors were fit to the data by minimizing the sum of the square of residuals when comparing each congener in the sample to the corresponding weighted sum of the four most commonly found Arochlors (Arochlors 1242, 1248, 1254, and 1260). The COS sample appears to contain primarily Arochlor 1254 with a small amount of Arochlor 1260; the Pines Facility sample includes all four Arochlors with Arochlors 1254 and 1260 being more pronounced. As was noted before, PCB-11 was not part of any of the original Arochlor formulations but appears to be significant in the Pines Facility sample. Some of the higher weight congeners in the Pines Facility sample also appear to be higher than what would be expected from the congener distribution of native Arochlor mixtures. The coeluting PCBs 110 and 115 appear to be significantly higher in both the COS and Pines Facility samples than what would be expected from a combination of Arochlors.

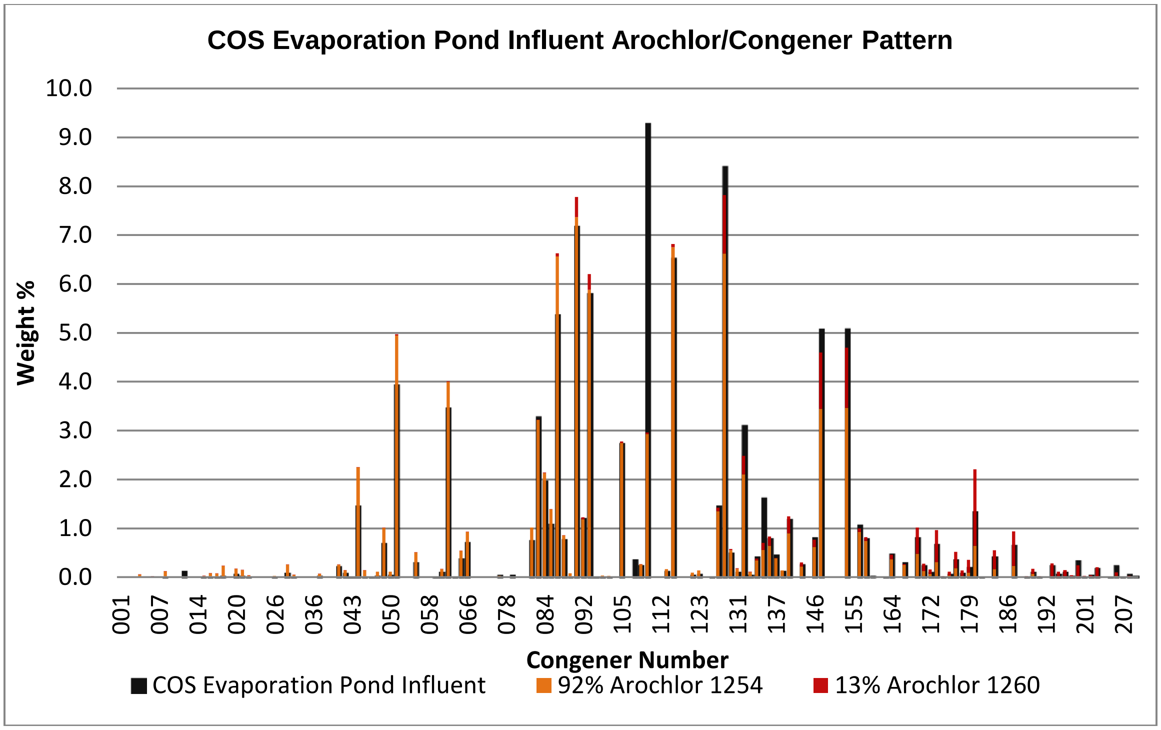

Fig-6 COS Arochlor Composition

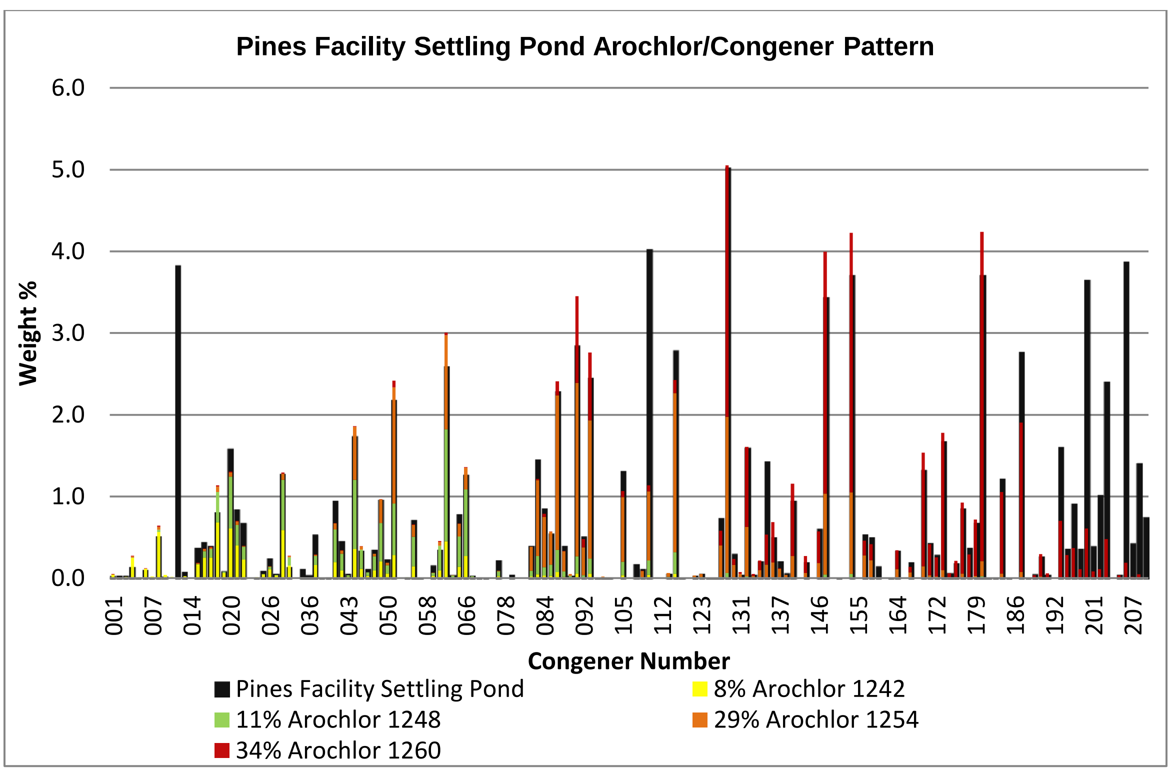

Fig-7 Pines Facility Arochlor Composition

For the liquid samples tested, total PCB levels generally correlated well with total suspended solid concentrations (see: Fig-8). PCBs are predominately hydrophobic and typically adhere to the particulate material in a given waste stream so seeing this correlation would be expected. Similar correlations were found between total PCBs and the metals that were tested. This is likely more of a function of suspended solids content rather than a direct relationship between pollutants.

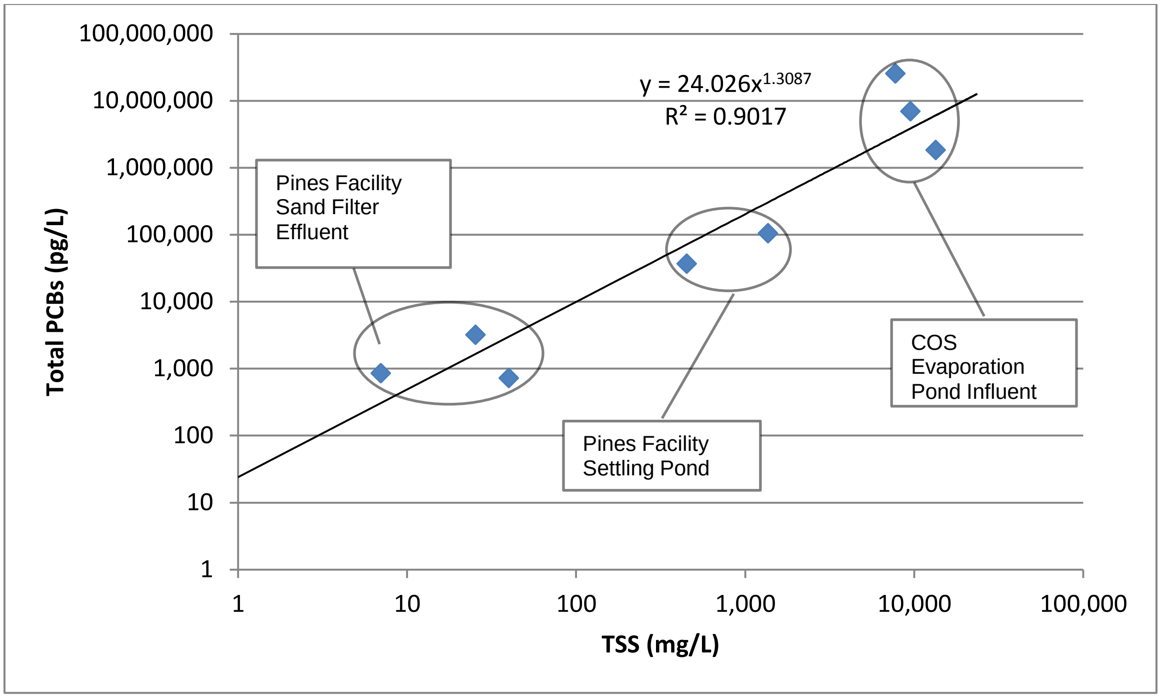

Fig-8 PCB/TSS Comparison. Note: Logarithmic-Scale

Conclusions

Based on the two days of sampling, the Pines Facility demonstrated 98% removal of total PCBs when comparing the average in the Pines Facility settling pond to the discharge from the sand filter. The Pines Facility sand filter effluent was shown to be lower in PCBs than what has been typically found during stormwater testing conducted by the City of Spokane. For example, PCBs in the Cochran Basin study showed stormwater to have an average PCB concentration of 7,300 pg/L whereas the average for the three sand filter samples was 1,580 pg/L. It is hard to predict the amount of PCBs that would be introduced to the Spokane River from this facility given the often complex interchange between the Aquifer and the River. Further PCB removal would probably be likely through infiltration, especially those PCBs contained in the remaining suspended solid material that was present after the sand filter. After decanting and drying, approximately 2,000 tons of solid material is expected to be removed from this facility on an annual basis. Using the average of the solids samples for the Pines Facility, this equates to approximately 7 grams per year of PCBs removed from the DOT/City of Spokane Valley stormwater system.

The City of Spokane Playfair facility was designed to confine all PCB-containing material onsite through the use of the evaporation pond. The main potential for reintroduction of this material to the environment at this facility is through aerial re-suspension of sediment in the evaporation pond during dry periods as dust. Recommended best practices for this facility would include measures to ensure dust is kept at a minimum. This could include activities such as spraying down the evaporation pond with water to direct any sediment in the pond to a central location and routinely removing sediment from the pond to be taken to landfill with the rest of the catch-basin sediment. Approximately 1,000 tons of solid material is expected to be removed from the Playfair Facility on an annual basis. This is equivalent to roughly 190 grams per year of PCBs removed from the City of Spokane stormwater system when using the average concentration of total PCBs from the two COS solids samples (note: this number may be skewed towards the high side due to one of the COS sediment PCB results being much higher than what was found in the Pines Facility sediment and the other COS sediment sample).

Future studies involving stormwater/vactor sediment could include monitoring of the Spokane County facility to confirm the expectation that PCB levels would be similar at this location. Another project that has been suggested is to determine if additional filtration utilizing biochar, an activated carbon product, would be appropriate for PCB removal of vactor liquid runoff. The City of Spokane is currently conducting a pilot study to determine the effectiveness of biochar amended soil in storm gardens that have been built along Garland St. in North Spokane. The results of this study could likely be used to inform and supplement future studies involving biochar. Another idea that has been suggested was to take sediment core samples at the infiltration area of the Pines Facility to see if PCBs are primarily accumulating in the top layer of soil or if migration of PCBs down into the aquifer is occurring.

Overall, the results of this study confirmed the presence of PCBs at levels of concern in catch-basin sediment at the Pines and City of Spokane Decant Facilities. However, treatment at both of these facilities appears to significantly reduce the amount of PCBs being discharged to the environment. Given the limited number of samples that were collected for this study, it should be emphasized that PCB levels may be significantly different at different times of the year and that the results should be considered, at best, semi-quantitative estimates. Given previous studies, the relative magnitude of the PCB results confirm what was generally expected at these sites. The Department of Transportation has been conducting additional sampling for PCBs and other pollutants at the Pines facility. At the time of writing this report, the results of this study were not yet available.

Appendix A: Additional Metals Testing Data

SAMPLE	DATE	Ag (mg/L)	Al (mg/L)	Ba (mg/L)	Be (mg/L)	Ca (mg/L)	Mg (mg/L)
COS Evaporation Pond Influent (Metals)	4/16/2015	<0.005	220	2.15	0.009	233	126
COS Evaporation Pond Influent Dup (Metals)	4/16/2015	<0.005	190	1.90	0.008	213	117
COS Evaporation Pond Influent (Metals)	4/17/2015	<0.005	272	2.55	0.012	255	133
Pines Facility Settling Pond	4/22/2015	<0.005	15.5	0.495	<0.002	90.9	58.1
Pines Facility Settling Pond DUP	4/22/2015	<0.005	15.0	0.502	<0.002	95.3	60.8
Pines Facility Settling Pond	4/23/2015	<0.005	49.7	0.819	<0.002	77.7	49.8
Pines Facility Sand Filter Effluent	4/22/2015	<0.005	0.45	0.139	<0.002	78.5	29.1
Pines Facility Sand Filter Effluent DUP	4/22/2015	<0.005	0.45	0.135	<0.002	76.1	28.3
Pines Facility Sand Filter Effluent	4/23/2015	<0.005	0.99	0.243	<0.002	107	52.9

SAMPLE	DATE	Mo (mg/L)	Ni (mg/L)	Sb (mg/L)	Se (mg/L)	Tl (mg/L)	V (mg/L)
COS Evaporation Pond Influent (Metals)	4/16/2015	<0.015	0.260	<0.025	<0.025	0.0395	0.607
COS Evaporation Pond Influent Dup (Metals)	4/16/2015	<0.015	0.228	<0.025	<0.025	0.0264	0.532
COS Evaporation Pond Influent (Metals)	4/17/2015	<0.015	0.319	0.036	<0.025	0.0279	0.616
Pines Facility Settling Pond	4/22/2015	0.021	0.024	<0.025	<0.025	<0.020	0.036
Pines Facility Settling Pond DUP	4/22/2015	0.022	0.024	<0.025	<0.025	<0.020	0.034
Pines Facility Settling Pond	4/23/2015	<0.015	0.057	<0.025	<0.025	<0.020	0.102
Pines Facility Sand Filter Effluent	4/22/2015	0.018	0.006	<0.025	<0.025	<0.020	<0.005
Pines Facility Sand Filter Effluent DUP	4/22/2015	0.018	0.006	<0.025	<0.025	<0.020	<0.005
Pines Facility Sand Filter Effluent	4/23/2015	0.021	0.008	<0.025	<0.025	<0.020	<0.005

Appendix B: Original Data Reports – Electronic Files Attached

Appendix C: Approved QAPP

Quality Assurance Project Plan (QAPP) and Sampling and Analysis Plan (SAP)

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By:

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Background

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The Spokane River Regional Toxics Taskforce (SRRTTF) was formed in 2012 to address the issue of PCBs in the Spokane River. SRRTTF is a collection of regulators, public and private dischargers, environmental groups, and other interested parties spanning both Idaho and Washington. SRRTTF has taken on the adaptive management approach (source identification and cleanup actions are pursued concurrently) to address the PCB issue in this area. With the goal of making measured PCB reductions in the Spokane River sooner rather than later, the adaptive management approach was chosen as an alternative to the predictably long and costly process of developing a TMDL. The ultimate goal of the taskforce is to make measurable progress towards meeting the water quality standards for PCBs in the Spokane River.

Stormwater runoff has been one of the previously identified contributors to PCBs in the Spokane River. As part of the Eastern Washington Phase II Municipal Permit, best management practices (BMPs) require stormwater catch basins to be periodically cleaned out to remove buildup of solids. Previous testing by the City of Spokane has shown that catch basin sediment can contain orders of magnitude greater PCB content than the stormwater itself. This can be reasoned due to the fact that PCBs are generally hydrophobic and tend to adhere to the particulate material in a given waste stream. Monitoring by the city has shown that in the Union Stormwater and CSO 34 area of the system, total PCBs in catch basin sediment ranged between 25 μg/kg and 1,700 μg/kg. These samples were taken from an industrial area with known PCB contamination. Only one sample was taken in an area representing a more typical catch basin, which gave a result of 13 μg/kg.

Stormwater sediment is removed from catch basins in the Spokane area by using vacuum eductor trucks (vactors). Environmental concerns were raised in recent years about how this material was being handled. The material itself still contains a significant amount of free liquids and must be drained and dried before it can be disposed. Regionally, Beginning in 2014, two new decant facilities came online, with a third set to come online in 2015, to allow for catch basin sediment to be drained and dried prior to land-filling or recycling. These facilities were designed as, essentially, large concrete pads where the sediment is allowed to drain. The liquid portion of the sediment is then either treated prior to infiltration in the case of the Spokane County and Joint WSDOT-City of Spokane Valley facility or directed to an evaporation pond in the case of the City of Spokane facility.

City of Spokane Decant Facility

The City of Spokane Decant Facility is located at 2813 E. Ferry Ave. on what was formerly the Playfair site. The facility consists of an approximately 20,000 square-ft covered concrete slab which drains into an evaporation pond. The evaporation pond was designed such that overflows would not occur. Stormwater sediment is taken to landfill after it has sufficiently dried on the pad. The landfill the City currently uses is the North Side landfill, but plans are underway to transition to the Graham Rd. landfill. It is anticipated that solids will accumulate in the pond over time and will have to be removed periodically and taken to landfill as well.

One logistical issue with sampling this site is that the amount of liquid that drains into the evaporation pond is variable, and typically only occurs when trucks are actively unloading. Depending upon the schedule of Wastewater Management staff, there may be days when vactor trucks are tied up with other activities and will not be utilizing the facility. The amount of liquid in the catch basin material is also dependent upon recent rainfall/runoff. During drier periods, there may not be enough flow from the site to sufficiently collect a liquid sample.

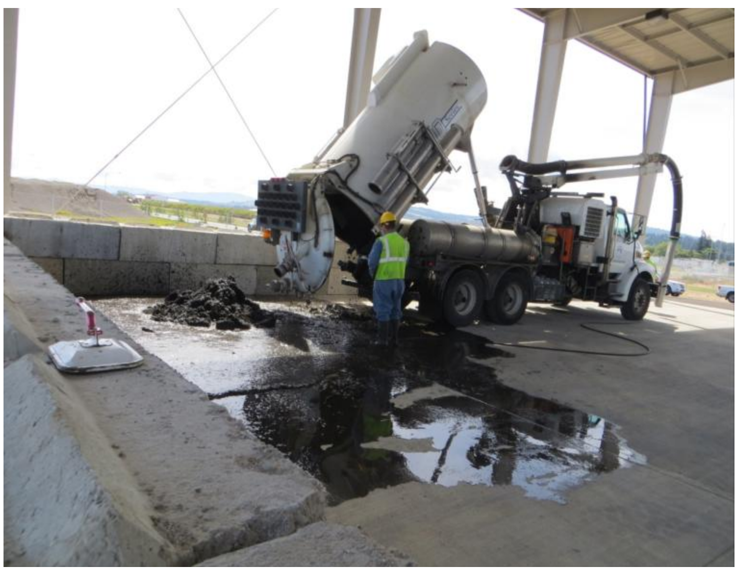

Fig-1 City of Spokane Decant Facility – vactor unloading

City of Spokane Valley/WSDOT Pines Decant Facility

The joint City of Spokane Valley –WSDOT facility is located at E. 12102 Montgomery Dr., adjacent to I-90, just west of the Pines Exit. The facility consists of an approximately 6,400 square-ft slab which allows decanted material to drain into an adjacent settling pool. Water from the settling pool is then directed to an oil-water separator, followed by a sand filter bed, and finally to a bio-infiltration pond. Stormwater exceeding the capacity of the bio-infiltration pond is directed to a drywell. There are plans to cover this facility in the future as well as potentially discharge decant-water to the sewer leading to the Spokane County Reclamation Facility.

Sampling at this facility will present similar logistical challenges as the City of Spokane facility. Liquid tends to only flow all the way through to the sand filter during times of heavier use and in days following rainfall/runoff events.

Fig-2 City of Spokane Valley/WSDOT facility

Spokane County Decant Facility

Construction is currently underway for the Spokane County Facility at 12807 N. Mayfair in North Spokane and is anticipated to be completed by mid-2015. The capacity of the facility will be similar to the Playfair location, with a 100-ft-by-200-ft covered concrete slab. Decanted liquid will be treated with an oil-water separator followed by a bio-swale and dry well.

Fig-3 Spokane County Decant Facility – under construction

Project Description

The goal of this project is to characterize both the solid and liquid material at the regional decant facilities for PCBs. This will allow for the amount of PCBs being removed from the stormwater system, through catch basin maintenance, to be more accurately estimated. It will also identify any potential rerelease of PCBs into the environment from the separated liquid and dried solids that are recycled. Metals and total suspended solids will also be measured in the liquid material to determine if any correlations exist between PCBs and these other pollutants for this material.

WSDOT currently has an Ecology-approved QAPP for monitoring the liquid portion of their facility, which includes PCB monitoring. The study outlined here will help to supplement DOT's monitoring to further understand the content and fate of PCBs at both the City of Spokane and Pines facilities.

Samples will be collected from the City of Spokane Decant Facility and Spokane Valley/DOT Pines Decant Facility. After comparing the results from the inputs of these two sites, PCB loading at the future Spokane County Facility could be estimated. Future monitoring at the Spokane County facility, once it is operational, may also be desired.

Schedule

A tentative schedule for this project is detailed below in Table 1. Due to time constraints with regards to Ecology grant funding that expires June 30th, 2015, invoices from all testing must be processed prior to that date.

Table 1: Project Schedule

Activity	Estimated Completion Date
QAPP completed	April 2nd, 2015
QAPP reviewed by Ecology	April 10th, 2015
Sample collection	May 15th, 2015
Laboratory analyses	June 30th, 2015
Data review	July 31st, 2015
Draft report to SRRTTF	August 23rd, 2015
Final report completed	September 31st, 2015

Organization

The City of Spokane staff will be primarily responsible for the management of this project as well as sample collection. Specific responsibilities are outlined in Table 2.

Table 2: Project Organization and Responsibilities

Staff	Title	Responsibility
Dale Arnold City of Spokane Wastewater Management 509.625.7901	Director	Reviews and approves QAPP
Lynn Schmidt City of Spokane Wastewater Management 509.625.7908	Stormwater Coordinator	Reviews and approves QAPP, project management, reports results to SRRTTF
Mike Cannon City of Spokane RPWRF 509.625.4642	Laboratory Supervisor	Reviews QAPP
Jeff Donovan City of Spokane RPWRF 509.625.4638	Chemist	Writes, reviews, and approves QAPP, organizes sampling and analysis, QA/QC
Gary Bussiere City of Spokane RPWRF 509.625.4628	Laboratory Technician	Sample collection
Kyle Arrington City of Spokane RPWRF 509.625.4647	Laboratory Technician	Sample collection

Budget

The funding for the analyses being performed in this study is being provided by the SRRTTF. Part of the SRRTTFF funding comes from grant money provided by Ecology. The analytical cost for this study is estimated to be $10,125 (Table 3). The costs associated with preparing the QAPP, conducting sampling, and data review are being covered by the City of Spokane (not estimated here). City of Spokane will also cover the cost of TSS and metals analyses conducted at the RPWRF Laboratory.

Table 3: Analytical Cost Estimate for analyzing PCBs

Analytical Method	Number of Samples	Cost per Sample	Total
PCBs: 1668C	9	$785	$7,065
PCBs: Modified 8270	6	$460	$2,760
Sample Shipping			$300
		TOTAL:	$10,125

Data Quality Objectives

The following test methods will be used in this study: EPA Method 1668C for PCBs in liquid samples, EPA 200.7 for total metals (As, Cd, Cr, Cu, Pb Zn), and SM 2540 D for total suspended solids (TSS). Modified EPA Method 8270 (AXYS internal method MLA-007) will be used for solid/sediment samples. All 209 PCB congeners will be tested with both methods. Field measurements will also be taken for temperature and pH. All data shall be produced following the specific recovery, accuracy, and precision requirements outlined in Table 4. Other specific measurement quality objectives (MQOs) for this project are also listed in table 4. All samples will be analyzed by a laboratory accredited by the Washington State Department of Ecology.

The laboratory conducting the PCB analyses will be requested to report analytical results between the estimated detection level (EDL, 2.5 times the signal to noise ratio for that sample/analyte) and the reporting limit. For these results, a "J" flag shall be used to denote the values as estimates.

Table 4: Measurement Quality Objectives

Method	Analyte	Reporting Limit	Laboratory Blank	CCV Recovery	LCS Recovery	Surrogate Recovery	Laboratory Duplicate RPD
EPA 1668 C	PCB Congeners (209) – Liquid Samples	<20 pg/L per congener	<200 pg/L Total PCBs	50-145%	60-135%	25-150%	<50%[1]
Modified EPA 8270	PCB Congeners (209) – Solid/Sediment Samples	<0.2 μg/kg per congener	<5 μg/kg Total PCBs	60-130%	60-130%	40-130%[2]	<50%[1]
EPA 200.7	Total Metals (As)	25 μg/L	<12.5 μg/L	95-105%	85-115%	n/a	<20%[3]
EPA 200.7	Total Metals (Cd)	2 μg/L	<1 μg/L	95-105%	85-115%	n/a	<20%[3]
EPA 200.7	Total Metals (Cr)	5 μg/L	<2.5 μg/L	95-105%	85-115%	n/a	<20%[3]
EPA 200.7	Total Metals (Cu)	5 μg/L	<2.5 μg/L	95-105%	85-115%	n/a	<20%[3]
EPA 200.7	Total Metals (Pb)	30 μg/L	<15 μg/L	95-105%	85-115%	n/a	<20%[3]
EPA 200.7	Total Metals (Zn)	15 μg/L	<7.5 μg/L	95-105%	85-115%	n/a	<20%[3]
SM 2540 D	Total Suspended Solids	2.5 mg/L	<2.5 mg/L	n/a	80-120%	n/a	<30%

Table 4: Measurement Quality Objectives (Continued)

Method	Analyte	Matrix Spike Recovery	Matrix Spike Duplicate RPD	Field Blank	Field Duplicate RPD
EPA 1668 C	PCB Congeners (209) – Liquid Samples	n/a	n/a	<200 pg/L Total PCBs	<50%[1]
Modified EPA 8270	PCB Congeners (209) – Solid/Sediment Samples	n/a	n/a	<5 μg/kg Total PCBs	<50%[1]
EPA 200.7	Total Metals (As)	70-130%	<20%[3]	<12.5 μg/L	<20%[3]
EPA 200.7	Total Metals (Cd)	70-130%	<20%[3]	<1 μg/L	<20%[3]
EPA 200.7	Total Metals (Cr)	70-130%	<20%[3]	<2.5 μg/L	<20%[3]
EPA 200.7	Total Metals (Cu)	70-130%	<20%[3]	<2.5 μg/L	<20%[3]
EPA 200.7	Total Metals (Pb)	70-130%	<20%[3]	<15 μg/L	<20%[3]
EPA 200.7	Total Metals (Zn)	70-130%	<20%[3]	<7.5 μg/L	<20%[3]
SM 2540 D	Total Suspended Solids	n/a	n/a	<2.5 mg/L	<30%

[1]RPD criteria only applicable when congener result > 10x EDL
[2]PCB-3: 15-130%, PCB-8: 20-130%
[3] RPD criteria only applicable when result > 10x RL

Table 5: Field measurement specifications

Analyte	Instrument	Measurement Range	Accuracy	Resolution
pH	Accumet	-1.99 to 19.99	+/- 0.01	0.01
Temperature	Accumet	0 to 100 °C	+/- 0.3 °C	0.1 °C

Sampling Plan

The following tests will be performed on all liquid samples collected for this study:

- PCB congeners - EPA method 1668C (AXYS Analytical)
- TSS – SM 2540 D (RPWRF Lab)
- Total Metals – EPA 200.7; As, Cd, Cr, Cu, Pb Zn (RPWRF Lab)
- pH – SM 4500 H+ (RPWRF Field Crew)
- Temperature (RPWRF Field Crew)

Sediment samples will be tested for PCB congeners using a modified version of EPA method 8270 (AXYS internal method MLA-007).

Two samples from each location will be collected over two consecutive days. A total of 3 field duplicate samples (1 per location) will be collected for the following locations: COS Evaporation Pond Influent, DOT Vactor Sediment, and DOT Sand Filter-Treated liquid. Two field blanks will also be collected. Sampling activities for this study are summarized as follows in Table 6, and in figures 4 through 7:

Table 6: Sample Locations

Sample Name	Sample Description	Sample Location	Number of Samples
COS Vactor Sediment	Sediment - sampled from pile	City of Spokane Playfair Decant Facility	2 – (1/day for 2 consecutive days)
COS Evaporation Pond Influent	Liquid runoff from sediment – sampled from outfall leading to evaporation pond	City of Spokane Playfair Decant Facility	3 – (1/day for 2 consecutive days; 1 field duplicate)
Solids Sampling Field Blank	Lab water, processed in the field through all equipment used which will contact sediment samples	City of Spokane Playfair Decant Facility	1
DOT Vactor Sediment	Sediment - sampled from pile	Spokane Valley/DOT Pines Decant Facility	3 – (1/day for 2 consecutive days; 1 field duplicate)
DOT Liquid Runoff	Liquid runoff from sediment – sampled from settling pond	Spokane Valley/DOT Pines Decant Facility	2 – (1/day for 3 consecutive days)
DOT Sand Filter-Treated liquid	Liquid – sampled from outfall of sand filter	Spokane Valley/DOT Pines Decant Facility	3 – (1/day for 2 consecutive days; 1 field duplicate)

Sample Name	Sample Description	Sample Location	Number of Samples
Liquids Sampling Field Blank	Lab water, transferred in the field between liquid sample bottles	Spokane Valley/DOT Pines Decant Facility	1

Fig-4 COS Vactor Sediment Sample Location

Fig-5 COS Evaporation Pond Influent

Fig-6 DOT Vactor Sediment Sample Location

Fig-7 DOT Liquid Runoff Sample Location

Fig-8 DOT Sand Filter-Treated Liquid

Sampling Procedures

Samples will be collected directly into pre-cleaned sample containers, when possible. Sampling equipment will be required to facilitate transfer of certain samples to the final sample containers. Any sampling equipment used to collect PCB samples will be decontaminated as follows:

1. Liquinox (or equivalent) soap rinse
2. Tap water rinse
3. Lab grade DI water rinse;
4. 10% nitric acid rinse (this step is only necessary if the samples will also be tested for metals);
5. Triple rinse with lab grade water
6. Acetone rinse (pesticide grade)
7. Air dry.

After being cleaned, sampling containers and equipment exposed to the air will be protected from contamination via storage in sealed plastic bags or wrapping in foil (with the shiny side out).

Care should be taken to ensure sampling equipment does not contain materials that could potentially leach/adsorb PCBs. Approved materials include: glass, PTFE (Teflon), and stainless steel.

Prior to setting up samplers and collecting samples, City of Spokane staff should don appropriate PPE as required. High-visibility vests are required at the DOT facility. Wader-style boots are recommended for accessing some of the sampling areas. Clean, disposable, non-talc nitrile gloves must be used at all times when handling sampling equipment and containers.

At the time of sampling, fill out appropriate info on the sampling log sheet. Label all sample containers with date, time, sample number, sampling personnel, and sample analytes. Sample numbers will be generated through the RPWRF lab and will follow their standard format of YY-NNNNN, where YY is the two digit year and NNNNN is the count of samples processed through the lab for that year, beginning at 00001. Example sample logs and labels are shown in Appendix A.

PCB sample containers will be provided by AXYS Analytical Services. All other sampling material will be furnished by the City of Spokane RPWRF Lab.

Table 7: Sample Containers

Analysis	Matrix	Container	Preservation	Holding Times
PCBs	Water	1L amber glass, Teflon lid	Cool to 4 °C	1 year
PCBs	Solid/Sediment	8 oz. glass jar, Teflon lid	Cool to 4 °C	1 year
Metals (As, Cd, Cr, Cu, Pb Zn)	Water	250 mL HDPE	HNO_3 to pH <2, Cool to 4 °C	6 months
Total Suspended Solids	Water	1L HDPE	Cool to 4 °C	7 days

Samples will remain within the custody of sampling personnel until being brought back to the RPWRF laboratory. Chain of custody forms will be filled out by sampling personnel and will accompany samples during shipment to AXYS Analytical. Samples will be within the control of RPWRF personnel until received by the shipping carrier. The bill of lading will serve as custody documentation during shipment so long as the container remains unopened during shipment. AXYS staff will sign the chain of custody form once received and assume custody of the samples according to their laboratory's procedures. An example chain of custody form is shown in Appendix A.

The City of Spokane laboratory will collect all samples for this study. PCB samples will be shipped overnight to AXYS Analytical. Shipments will be packed in ice to maintain preservation temperatures.

COS Evaporation Pond Influent

There are two outfall pipes that lead to the evaporation pond. The northernmost pipe directs runoff from the main pad, and is where the COS Evaporation Pond Influent sample will be taken.

The COS Evaporation Pond Influent grab samples will be collected directly into new, pre-cleaned, glass bottles for PCB analysis. TSS and metals grab samples will be taken after the PCB sample into HDPE sample containers. Flow from the outfall is generally minimal, and will typically only occur for a short time after a vactor truck has unloaded. Because of this, coordination will be required with City of Spokane Sewer Maintenance staff so that samples can be taken when vactor trucks are unloading. It may require multiple trucks unloading within a short time span to create enough flow to collect a sample.

A single field duplicate from this location will be collected on one of the two sampling days. The duplicate sample will be collected directly after the initial sample.

COS Vactor Sediment/DOT Vactor Sediment

Both the COS and DOT Vactor Sediment samples will be collected using the same procedures, to the maximum extent practicable. It is assumed that each individual vactor that unloads will deposit sediment that has generally been well-mixed inside the tank of the truck. Each individual sample will be a composite of those piles, at the time of sampling, which can be distinctly identified. Piles which have been moved together by a front end loader will not be sampled. Procedures for collecting sediment samples are shown below:

1. Identify the sediment piles for that day which are going to be sampled, i.e., those piles which, in the best judgment of the sampling personnel, represent distinct unloads of a vactor truck.
2. Pick, at random, at least 5 areas of the first pile to be sampled.
3. From a chosen sampling spot, remove the top several inches of material with a stainless-steel spatula.
4. Collect a portion of sample from the exposed part of the pile and place into a stainless steel container for compositing. Avoid samples which contain identifiable trash or rocks larger than ¼" in diameter.
5. Repeat steps 3 and 4 until all identified sampling spots have been sampled for that pile, taking equal sized portions for each subsequent sample.
6. Continue the process with the rest of the piles, making sure the same number of subsamples are taken from each pile.
7. Create a final composite by first mixing the contents of the stainless steel container thoroughly with stainless steel spatula. Then, using the same spatula, transfer a sufficient amount of material into an 8-oz glass jar for PCB analysis.
8. Note the number of piles and the number of subsamples from each pile in the sampling log.

A single field duplicate from the DOT location will be collected on one of the two sampling days. The duplicate sample will be collected from the same mixed stainless steel container as the original sample obtained in step 7, above.

DOT Liquid Runoff

The DOT Liquid Runoff sample will be taken from one of the two first settling areas at the Pines facility as indicated in Fig-7. There are two separate initial settling areas (east and west) which are used alternately depending upon which side of the facility is currently being used to unload material. The sample should be taken from the side where trucks have most recently unloaded. The sample should be taken from the middle of the settling area.

PCB samples will be collected directly into 1-L glass bottles with the use of an extension pole. TSS and metals samples will be collected with an HDPE dipper on an extension pole.

DOT Sand Filter Treated Liquid

The DOT Sand Filter Treated sample will be taken from the outfall of the sand filter as it enters the bio-infiltration swale, as indicated in Fig-8. The grab samples will be collected directly into new, pre-cleaned, glass bottles for PCB analysis. TSS and metals grab samples will be taken after the PCB sample into HDPE sample containers.

A single field duplicate from this location will be collected on one of the two sampling days. The duplicate sample will be collected directly after the initial sample.

Field QC Blanks

The first QC blank will mimic the liquid sampling procedures. Since all liquid samples will be collected directly into pre-cleaned sample containers, the liquids sampling field blank will be collected simply by pouring ultra-pure lab water from one 1-L sample container into another. This will be conducted in the open air on one of the sampling days at the Pines facility.

The second QC blank will mirror the solids sampling procedures. A 1-L bottle of ultra-pure lab water will be poured over a clean stainless steel spatula into a clean stainless steel bucket. The sample will then be transferred into a clean 8-oz jar and then finally back into a 1-L bottle. This sample will be collected in the open air on one of the sampling days at the Playfair facility.

Quality Control Procedures

Chain of custody procedures will be followed as per Standard Methods 21st Ed. pp 1-30.

A method blank, laboratory control sample (LCS), duplicate, and surrogate will be analyzed with each batch by AXYS for PCB analyses. A batch shall contain a maximum of 20 samples. Field blanks and field duplicates will be analyzed as indicated in the sampling procedures.

Method blank, LCS, duplicate, matrix spike, and matrix spike duplicate samples will be analyzed with each metals batch. Field blanks and field duplicates will also be analyzed.

Method blank, LCS, and duplicate samples will be analyzed with each TSS batch. Field blanks and field duplicates will also be analyzed.

Any QC results that are out of the acceptance ranges will be qualified when the associated batch of samples is reported. If the QC discrepancy is enough to invalidate the dataset, resampling and retesting may be required.

Data Management, Reporting, and Verification

Field Data Management

Sampling staff will report field data through the use of sample log sheets. Sample log sheets must be filled out after each sampling event. Sample log sheets will be archived at the RPWRF laboratory with copies transmitted to the project manager and QA/QC manager.

Sample logs will include:

- Field crew/samplers
- Sample name and ID
- Sample location
- Collection date/time
- Sampling method (grab/composite/etc.)
- Temperature and pH measurements
- Field observations

Chain of custody records will be copied and filed at the RPWRF lab and made available to the project manager and QA/QC manager.

Laboratory Data Management/Verification

Outside laboratory data reports must include all of the QC results associated with that batch of data. This will include method blank, lab control sample, duplicate, and surrogate recovery results. The report must also include a case narrative which discusses any difficulties, results that are outside the method acceptance criteria, corrective actions that were taken, and an explanation of data qualifiers that were used.

Hardcopy and electronic data deliverables (EDD) will be provided by the lab. EDD will be compatible with the Ecology Environmental Information Management (EIM) database.

Laboratory results will be verified and checked for errors upon being received by the RPWRF laboratory staff. This will be achieved by examining the case narrative, determining whether any QC results are outside the method criteria, and ensuring the affected results are qualified correctly when being entered into the RPWRF database. If there is significant QC problems with an analytical result, data rejection may be deemed necessary. Data rejection will occur through consultation with the testing laboratory. Depending upon the circumstances, reanalysis (and resampling if the original sample is no longer usable) should be pursued if a batch of data is rejected. This decision will be made at the professional discretion of the QA/QC manager.

Testing results will be entered into the RPWRF Laboratory database. Any samples that have been flagged shall be noted when entered into this system. PCB results that come in below the estimated detection limit shall be entered as the less-than symbol followed by the respective EDL for that analyte. Results obtained between the EDL and reporting limit shall be reported as an estimate by denotation with the letter "J" next to the value. Congeners flagged "N" or "NJ" due to incorrect ion ratios will be entered as non-detects when being entered into the RPWRF database.

Certain PCB congeners have peaks which cannot be resolved from one another. When such coelution occurs, one number will be reported as the total for multiple congeners (since differentiation is impossible given the method being used).

In addition to being reported as individual congeners, PCBs will be totaled as a whole and totaled for each level of chlorination (i.e. totaled for PCBs with one substituted chlorine atom, two substituted chlorine atoms, etc.). When being totaled, congeners flagged as non-detect will be counted as zero. Additionally, for any congener detections where an associated congener in the method blank is also detected, the sample result will be counted as zero if it is less than 3 times the value of the blank result. For results greater than or equal to 3 times each associated blank result, the reported sample value will be used in totaling. For totals where J-flagged values are included, the resulting total will be J-flagged as well.

Data validation qualifiers/flags are summarized as follows in Table 8:

Table 8: Data Qualifers

Data Flag	**Definintion**
U	The analyte was not detected at the reporting limit listed
UJ	The analyte was not detected at the estimated detection limit listed
N	The analyte was not detected due to incorrect ion ratio. The concentration reported is the estimated maximum possible concentration (EMPC).
NJ	The analyte was not detected due to incorrect ion ratio. The concentration reported is the EMPC and is between the estimated detection limit and reporting limit.
J	Sample concentration is less than lowest point on calibration curve and considered an estimate.
B	Sample concentration is <3x concentration found in associated blank
R	The data point is unusable and analyte may or may not be present.

Reporting

A report to SRRTTF will be made by the project manager once all data has been collected and analyzed. The report will summarize the findings of the study, and will include all laboratory data sheets, sampling logs, and QC results. The report will include a data usability assessment which will note whether or not the data quality objectives for the project were met and whether the data is sufficient to characterize the material being processed at the decant facilities. Due to the limited number of samples being collected for this project, the results may have a high level of statistical uncertainty attached to them. Other limitations to the data include the inability to capture changes in conditions due to weather patterns and seasonal differences in the material, and that the material sampled may represent only a small portion of the catch-basins maintained by the respective agencies. These uncertainties should all be noted and discussed in the final report.

The report will compare current results with previous studies conducted by the City on stormwater and stormwater sediment. Results from the DOT study of the liquid stream of the Pines facility will also be included, if available. The report will also discuss possibilities for future studies that may be warranted.

References

WSDOT. Quality Assurance Project Plan for Monitoring Decant at the WSDOT/City of Spokane Valley Pines Decant Facility. June, 2014

Lombard, S. and Kirchmer, C. Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies. Washington State Department of Ecology, Olympia, WA. Publication No. 04-03-030

Appendix A

Example Sample Log

City of Spokane RPWRF
4401 N. Aubrey L. White Parkway
Spokane, WA 99205

Sampling Record

Date: ____________

Facility Sampled: ______________________________

Facility Address: ______________________________

Sampling Location: ______________________________

____

Sample Type: Grab ☐ Comp (Time / Flow) ☐

Person Sampling: ______________________________

ID#	Sample	Time:	pH:	Temp:	Physical Desc.	Sample Checkout Date/Int.

Sample Notes:

Contact: ______________________

Title: ______________________ Ph: ______________________

◯ Samples preserved as necessary & placed in lab cooler #2A @ 4˚C: ______________________

Example Sample Label

Client: City of Spokane RPWRF
Project: Decant Study
Sample ID:
Date: **Time:**
Analysis:
Pres.:

Example Chain of Custody Form

SPOKANE

CHAIN OF CUSTODY RECORD

City of Spokane, Wastewater Management
Wastewater Laboratory
4401 N. Aubrey L. White Parkway
Spokane, WA 99205
(509) 625-4600

Page ________ of ________

From: Name: ____________
Address: ____________
____
Phone: ____________
Contact: ____________
Email: ____________

To: Name: ____________
Address: ____________
____
Phone: ____________
Contact: ____________
Purchase Order #: ____________
Shipper Tracking Number: ____________

Sample Transfer (sign below)

1. Relinquished By:		3. Relinquished By:	
(print)	Date:	(print)	Date:
(sign)	Time:	(sign)	Time:
2. Received By:		4. Received By:	
(print)	Date:	(print)	Date:
(sign)	Time:	(sign)	Time:
Storage Location (Refrigerator Location):			

Test Parameters (include Method Number)

	Sample Description	Sample Type	AWTP ID#	Collection Time	Collection Date	Matrix (key below)	Preserv. (key below)	Reporting units	# of Cont.	Comments										
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Matrix: DW - Drinking Water, GW - Ground Water, WW - Wastewater, L - Liquid, S - Solid/Sludge, SO - Soil
O - Other

Preservation: R - Refrigerate (4C), F - Freeze, N - Nitric Acid, H - Hydrochloric Acid, O - Other
SH - Sodium Hydroxide, S - Sulfuric Acid

Sample Type: G - Grab, C - Composite

Version: 71703

Upon Rec'd Data, Complete Following Steps:
( ) Data Original to Respective File
( ) Data Copy File With This Document
( ) Invoice to Warehouse for Payment
Invoice #: ____________
( ) Data file location ____________